

nervulus interstitial with basal vein. Abdomen smooth and polished; first tergum about as long as apical width, with 2 median, parallel carinae which extend posteriorly from base to apical $\frac{1}{8}$ of tergum; ovipositor at most as long as abdomen beyond first tergum.

Male.—Essentially as in female; length of body, 5.5–9 mm; first abdominal tergum occasionally rugose between carinae.

Holotype Female.—TEXAS: Uvalde, flesh and green bottle flies, Dec., '35, A. W. Lindquist. USNM 69957.

Paratypes.—ARIZONA: Duncan, 2 ♀♀, 1 ♂, September 22, 1931, parasite of blow fly, A. W. Lindquist, Bishop No. 17273. TEXAS: 23 ♀♀, 57 ♂♂, same data as holotype. All paratypes are deposited in the U. S. National Museum.

REFERENCES

- Lindquist, A. W. 1932. *Alysia ridibunda* Say, parasitic on blowfly larvae, J. Econ. Ent. 25:414–415.
- . 1940. The introduction of an indigenous blowfly parasite, *Alysia ridibunda* Say, into Uvalde County, Texas. Ann. Ent. Soc. Amer. 33:104–112.
- Roberts, R. A. 1935. Some North American parasites of blowflies. J. Agr. Res. 50:479–494.

WATER MITES OF THE GENUS *STYGOMOMONIA* IN NORTH AMERICA (ACARINA, MOMONIIDAE)¹

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This paper treats eight species of *Stygomomonía* Szalay known from North America, six of which are described as new. The two previously described species are *S. riparia* Habeeb and *S. moodyi* Mitchell. Holotypes and allotypes will be deposited in the Field Museum of Natural History (= Chicago Natural History Museum). In presenting measurements in this paper, those of the holotype and allotype are given first. If a series of specimens is available, the range of variation is given in parentheses following the measurements of the primary types.

Members of the genus *Stygomomonía* exhibit considerable intra-specific variation in number of heavy setae on the fourth coxae and in shape and distance apart of the suture lines of the third and fourth coxae. The structure of the palp is very similar in all species of *Stygomomonía* s. s. and is therefore nearly useless in defining species. The author has found proportions of the distal segments of the first leg, structure of the peripheral thickening of the dorsal shield, and

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degree of fusion of the posterior glandularia platelets of the venter to be the most stable characters which seem to be of taxonomic value. Since most of the species diagnoses are based on a combination of characters, a key to species is provided as an aid in identification.

The genus is primarily a group confined to interstitial waters, but where abundant, specimens are occasionally taken in "surface water" collections. Since the subsurface water habitat has been poorly sampled in many areas of the world, the true distribution of the genus is probably unknown. Species of *Stygomomonina* have been collected in Europe, Japan and North America. A rather unusual species from New Zealand has also been tentatively assigned to this genus. It is interesting that extensive collections of interstitial water mites made by the author in Western India were negative as far as *Stygomomonina* was concerned.

It is here proposed that the genus *Stygomomonina* be divided into three subgenera, two of which have a Holarctic distribution and a third which is known only from New Zealand.

Subgenus *Stygomomonina* Szalay

Diagnosis: Characters of the genus *Stygomomonina*; anterior coxal groups (first and second coxae) separated by articular membrane from the third coxae; genital field of male subterminal in position; dorsal shield entire; excretory pore not fused with the posterior glandularia platelets.

Subgenotype: *Stygomomonina latipes* Szalay.

Discussion: The separated anterior coxal groups are diagnostic for the typical subgenus. Members of *Stygomomonina* s. s. are known from Europe, Japan and North America.

Subgenus *Allomonina*, n. subgen.

Diagnosis: Characters of the genus *Stygomomonina*; anterior coxal groups (first and second coxae) fused with the third coxae; genital field of male located at extreme posterior end of ventral shield; dorsal shield entire; excretory pore not fused with the posterior glandularia platelets.

Subgenotype: *Stygomomonina moodyi* Mitchell.

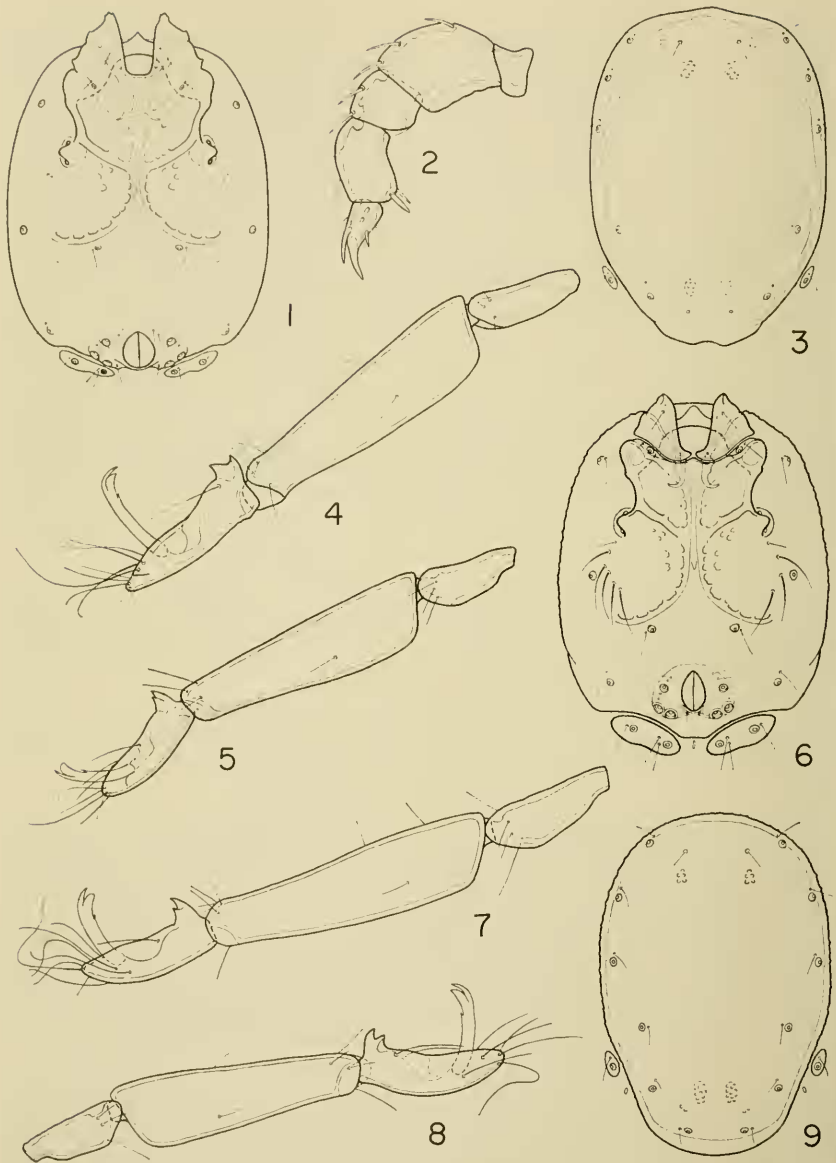
Discussion: The fused condition of the coxae and the entire dorsal shield are characters which will separate *Allomonina* from other subgenera of *Stygomomonina*. The new subgenus has representatives in Japan and North America.

Subgenus *Neomonina*, n. subgen.

Diagnosis: Characters of the genus *Stygomomonina*; anterior coxal groups (first and second coxae) fused with the third coxae; dorsal shield divided into anterior and posterior sclerites; dorsal shield closely flanked by several pairs of platelets; excretory pore fused with the enlarged posterior glandularia platelets.

Subgenotype: *Stygomomonina torquipes* Hopkins.

Discussion: The new subgenus is based on a female specimen described by Hopkins (1966) from New Zealand. It appears to be a rather divergent member of the genus *Stygomomonina* but, until the male is known, its placement in this genus should be regarded as tentative.



Figs. 1-3, *Stygomomonium moodyi* Mitchell: 1, ventral shield, ♂; 2, ♂ palp; 3, dorsal shield, ♂. Fig. 4, *S. separata*, n. sp., distal segments, 1st leg, ♂. Figs. 5, 6, 9, *S. occidentalis*, n. sp.: 5, distal segments, 1st leg, ♀; 6, ventral shield, ♂; 9, dorsal shield, ♂. Fig. 7, *S. neomexicana*, n. sp., distal segments, 1st leg, ♀. Fig. 8, *S. pallida*, n. sp., distal segments, 1st leg, ♂.

KEY TO NORTH AMERICAN SPECIES OF *Stygomonomia*

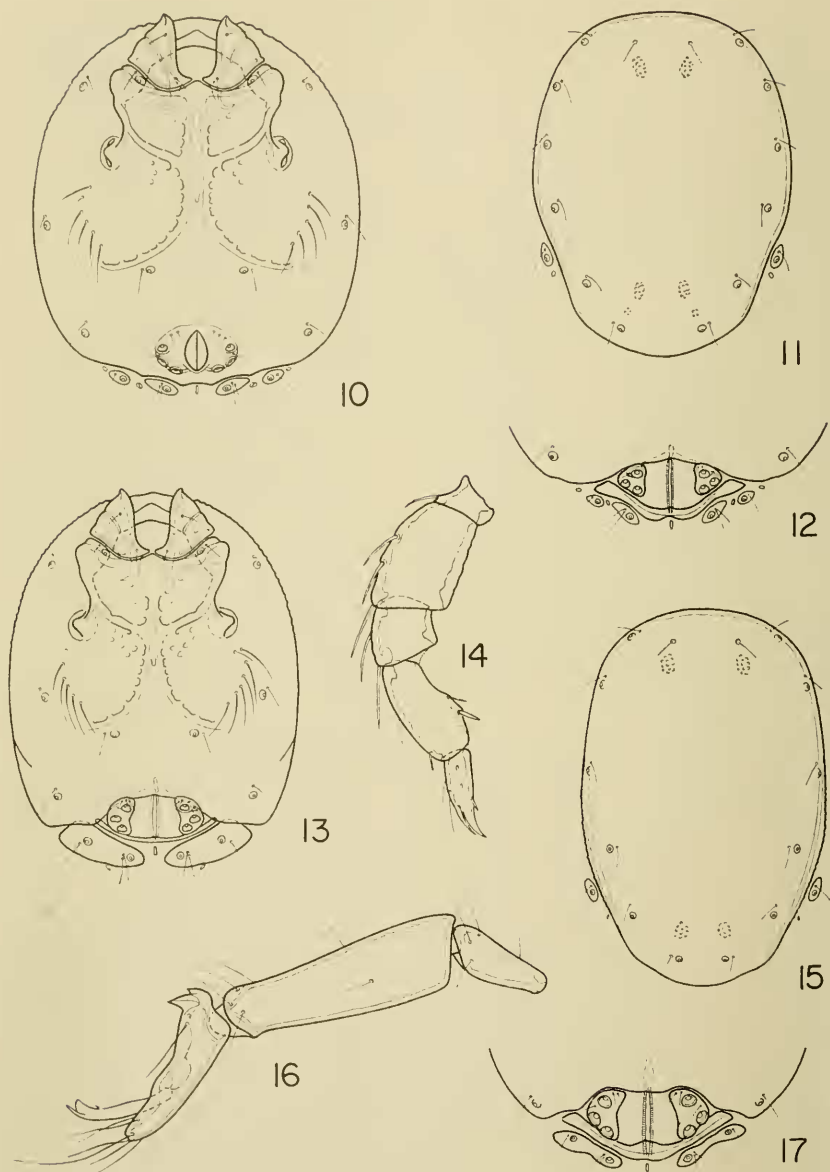
1. Anterior coxal groups (first and second coxae) fused with the third coxae (fig. 1); claw of first leg short and decidedly recurved (fig. 30) (subgenus *Allomonomia*) **moodyi** Mitchell
- Anterior coxal groups separated from the third coxae (fig. 6); claw of first leg relatively long and narrow, and only slightly recurved (fig. 4) (subgenus *Stygomonomia*) 2
2. Four pairs of genital acetabula present (figs. 18, 25) **riparia** Habeeb
- Three pairs of genital acetabula present (figs. 21, 23) 3
3. The two pairs of glandularia posterior to the genital field located on small sclerites which are either separated (fig. 10) or only lightly fused (fig. 28) 4
- The two pairs of glandularia posterior to the genital field located on relatively large sclerites which are broadly fused on their respective sides (fig. 6) 5
4. Dorsal projection on basal portion of I-Leg-6 somewhat proximal in relation to attachment site of segment (fig. 4) **separata**, n. sp.
- Dorsal projection on basal portion of I-Leg-6 distal in relation to the attachment site of segment (fig. 7) **neomexicana**, n. sp.
5. Dorsal projection on basal portion of I-Leg-6 somewhat proximal in relation to attachment site of segment (fig. 16) **plana**, n. sp.
- Dorsal projection on basal portion of I-Leg-6 distal in relation to the attachment site of segment (figs. 5, 8, 22) 6
6. I-Leg-4 greatly expanded at distal end (fig. 22) **ozarkensis**, n. sp.
- I-Leg-4 only slightly expanded at distal end (figs. 5, 8) 7
7. I-Leg-5 more than twice the length of I-Leg-6 (fig. 5); peripheral thickening of dorsal shield not extending medially towards posterior glandularia (fig. 9) **occidentalis**, n. sp.
- I-Leg-5 less than twice the length of I-Leg-6 (fig. 8); peripheral thickening of dorsal shield extending medially towards posterior glandularia (fig. 29) **pallida**, n. sp.

***Stygomonomia (Allomonomia) moodyi* Mitchell**
(Figs. 1-3, 17, 30)

Stygomonomia moodyi Mitchell, 1959, Trans. Amer. Microsc. Soc. 78:154.

Male: Dorsal shield 426 μ -471 μ in length, 312 μ -348 μ in width; dorsal shield with ill-defined ridges near periphery (fig. 3); ventral shield, including posterior glandularia platelets 441 μ -471 μ in length, 350 μ -395 μ in width; anterior coxal groups solidly fused with the third coxae; 2 small setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; genital field 124 μ -156 μ in width; 3 pairs of genital acetabula; genital field terminal (fig. 1); posterior glandularia of venter fused on their respective sides into elongated platelets which are slightly constricted in middle, these platelets 69 μ -79 μ in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, 14 μ -17 μ ; P-II, 42 μ -48 μ ; P-III, 21 μ -24 μ ; P-IV, 35 μ -39 μ ; P-V, 29 μ -31 μ ; fig. 2 illustrates the proportions and chaetotaxy of the palp; dorsal lengths of the distal segments of the first leg:



Figs. 10–12, *Stygomomonium separata*, n. sp.: 10, ventral shield, ♂; 11, dorsal shield, ♂; 12, genital field region, ♀. Figs. 13, 15, 16, *S. plana*, n. sp.: 13, ventral shield, ♀; 15, dorsal shield, ♀; 16, distal segments, 1st leg, ♀. Fig. 14, *S. occidentalis*, n. sp., ♂ palp. Fig. 17, *S. moodyi* Mitchell, genital field region, ♀.

I-Leg-4, 81μ – 90μ ; I-Leg-5, 104μ – 121μ ; I-Leg-6, 61μ – 62μ ; structure of first leg similar to female; swimming hairs absent.

Female: Dorsal shield 426μ – 483μ in length, 319μ – 380μ in width; dorsal shield similar to that illustrated for the male; ventral shield, including posterior glandularia platelets 441μ – 517μ in length, 350μ – 441μ in width; anterior coxal groups solidly fused with the third coxae; typically with 2 (but in one instance 3) small setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; acetabular plates and postgenital sclerite separated from the ventral shield (fig. 17); genital field 135μ – 187μ in width; the individual acetabular plates 33μ – 52μ in width; 3 pairs of genital acetabula; posterior glandularia as described for male, these 73μ – 80μ in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigment absent.

Dorsal lengths of the palpal segments: P-I, 14μ – 16μ ; P-II, 45μ – 48μ ; P-III, 21μ – 24μ ; P-IV, 36μ – 38μ ; P-V, 28μ – 31μ ; structure of palp similar to male; dorsal lengths of the distal segments of the first leg: I-Leg-4, 83μ – 90μ ; I-Leg-5, 118μ – 133μ ; I-Leg-6, 62μ – 66μ ; claw at tip of first leg recurved; fig. 30 illustrates the modification of the first leg; swimming hairs absent.

Material Examined: 1 female, from a gravel bar in the Smith River (approximately 18 miles east of Gardiner), Douglas County, Oregon, August 12, 1961; 33 males, 13 females, collected in a gravel bar in Ten Mile Creek approximately 7 miles of Yachats, Lane County, Oregon, August 13, 1961; 2 males, taken in a gravel bar in Satus Creek (approximately 3 miles south of Yakima County line), Klickitat County, Washington, August 18, 1967; 1 female, taken in bottom gravels in Battle Creek 4 miles west of Viola, Shasta County, California, July 30, 1966; 1 male, from gravel deposits in a small stream near Warm Springs, Bath County, Virginia, July 20, 1963. Mitchell originally recorded this species from Addison, Chittenden, and Washington Counties, Vermont.

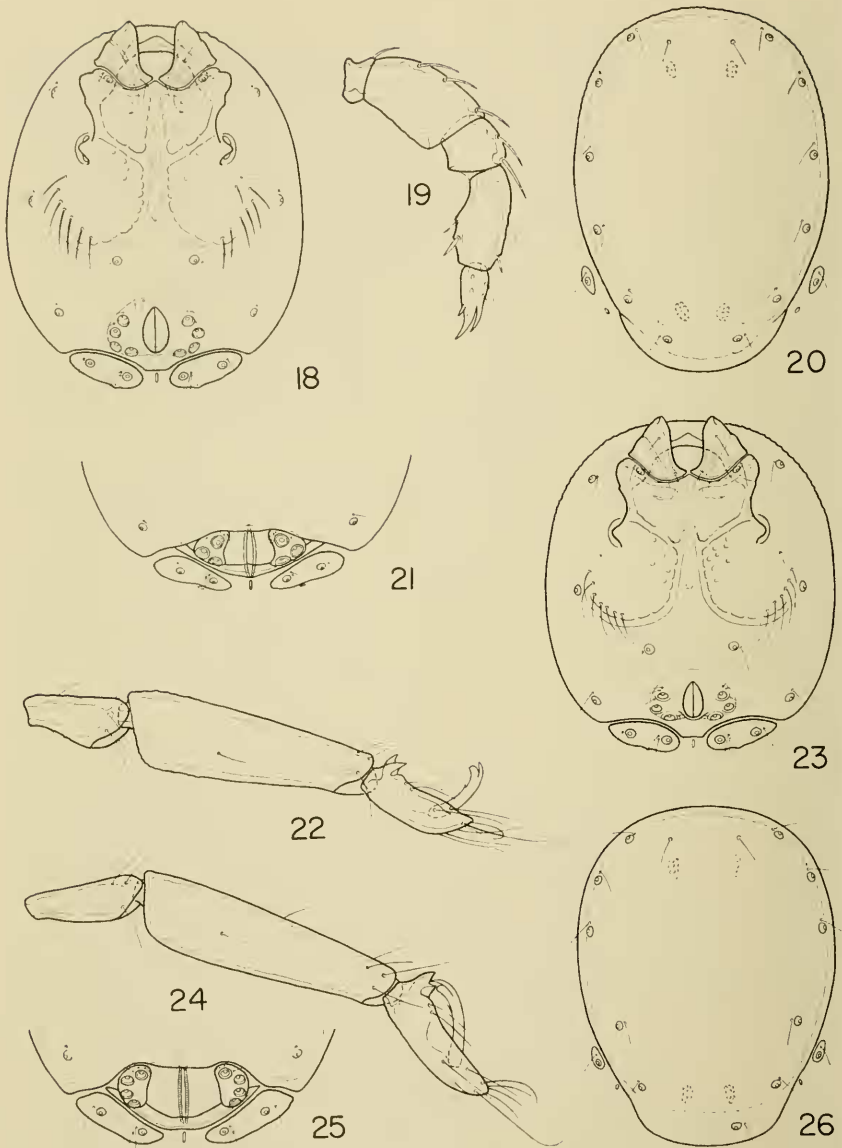
Discussion: The species *S. kantoensis* described by Imamura (1959) from Japan also has the anterior coxal groups fused with the third coxae. However, the latter species possesses numerous enlarged setae on the fourth coxae as illustrated in figs. 6 and 10, and the posterior glandularia of the venter are all separated from each other. *S. moodyi* possesses two very small setae on the fourth coxae (fig. 1) and the posterior glandularia of the venter are fused on their respective sides. The western populations of this species tend to be proportionally narrower and the genital field proportionally less wide than the eastern representatives. However, these differences are not clear cut and do not seem to justify subspecific separation.

Stygomomonina (Stygomomonina) riparia Habeeb
(Figs. 18, 20, 24, 25)

Stygomomonina riparia Habeeb, 1957, Leaflets of Acadian Biology 15:8.

Stygomomonina riparia; Mitchell, 1959, Trans. Amer. Microsc. Soc. 78:156.

Male: Dorsal shield 410μ – 524μ in length, 289μ – 365μ in width; peripheral thickening of dorsal shield extending medially towards posterior glandularia (fig. 20); ventral shield, including posterior glandularia platelets 418μ – 502μ in length, 334μ – 408μ in width; anterior coxal groups separated by articular membrane from



Figs. 18, 20, 24, 25, *Stygomomonina riparia* Habeeb: 18, ventral shield, ♂; 20, dorsal shield, ♂; 24, distal segments, 1st leg, ♂; 25, genital field region, ♀. Fig. 19, *S. pallida*, n. sp., ♂ palp. Figs. 21–23, 26, *S. ozarkensis*, n. sp.: 21, genital field region, ♀; 22, distal segments, 1st leg, ♂; 23, ventral shield, ♂; 26, dorsal shield, ♀.

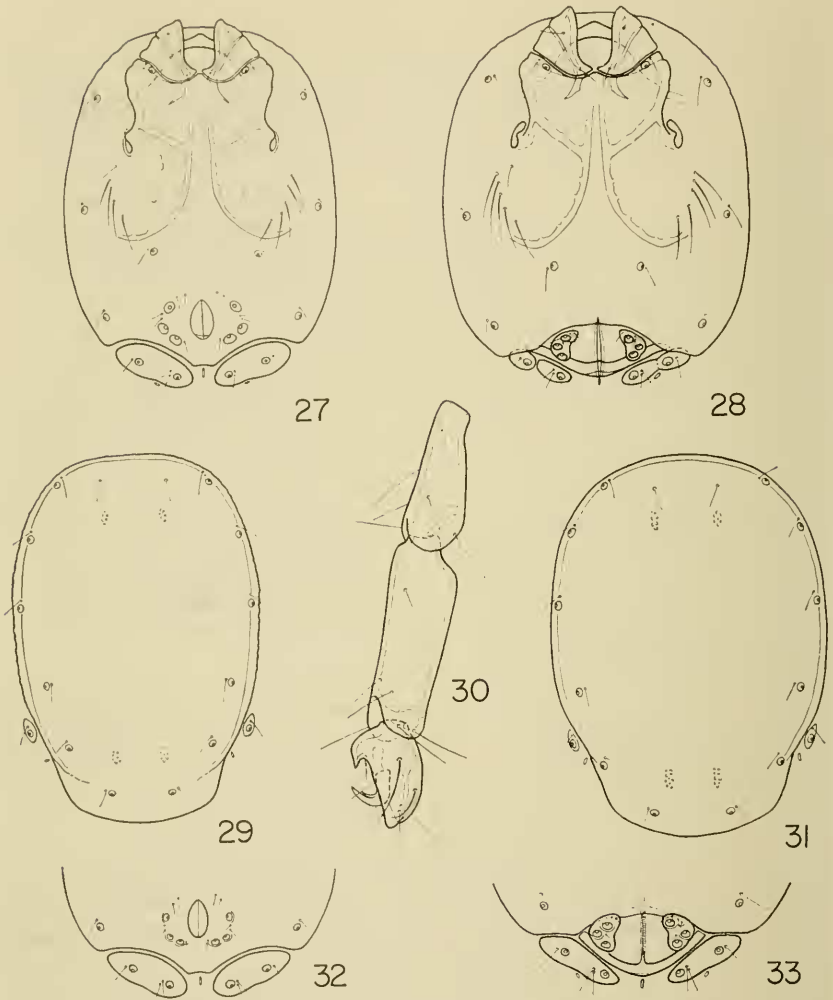
the third coxae; 5 to 7 enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; genital field 118μ – 141μ in width; typically with 4 pairs of genital acetabula but occasionally with only 3 acetabula on one side, 4 on the other side; posterior glandularia fused on their respective sides into oval platelets (fig. 18); these platelets 83μ – 111μ in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigment absent.

Dorsal lengths of the palpal segments: P-I, 15μ – 18μ ; P-II, 42μ – 45μ ; P-III, 23μ – 27μ ; P-IV, 42μ – 52μ ; P-V, 29μ – 36μ ; structure of palp similar to that illustrated in fig. 19; dorsal lengths of the distal segments of the first leg: I-Leg-4, 70μ – 90μ ; I-Leg-5, 156μ – 194μ ; I-Leg-6, 76μ – 80μ ; greatest heights of distal segments of first leg: I-Leg-4, 28μ – 35μ ; I-Leg-5, 42μ – 52μ ; I-Leg-6, 38μ – 45μ ; claw at tip of first leg 48μ – 52μ in length; fig. 24 illustrates the proportions and chaetotaxy of the distal segments of the first leg; swimming hairs absent.

Female: Dorsal shield 456μ – 525μ in length, 319μ – 358μ in width; dorsal shield similar to male; ventral shield, including posterior glandularia platelets 449μ – 517μ in length, 350μ – 418μ in width; anterior coxal groups separated by articular membrane from the third coxae; 4 to 7 enlarged setae present on each side of the fourth coxae posterior to insertions of the fourth legs; acetabular plates and postgenital sclerite separated from the ventral shield (fig. 25); genital field 138μ – 159μ in width; the individual acetabular plates 35μ – 45μ in width; typically with 4 pairs of genital acetabula, but one individual had only 3 acetabula on one side, 4 on the other side; posterior glandularia as described for male, 97μ – 124μ in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, 17μ – 19μ ; P-II, 42μ – 52μ ; P-III, 23μ – 27μ ; P-IV, 42μ – 48μ ; P-V, 31μ – 35μ ; dorsal lengths of the distal segments of the first leg: I-Leg-4, 76μ – 86μ ; I-Leg-5, 173μ – 201μ ; I-Leg-6, 76μ – 86μ ; greatest heights of distal segments of first leg: I-Leg-4, 29μ – 35μ ; I-Leg-5, 45μ – 59μ ; I-Leg-6, 38μ – 46μ ; claw at tip of first leg 52μ – 55μ in lengths; structure of palp and first leg similar to male.

Material Examined: (All collections from sand and gravel deposits of streams) 5 males, 4 females, 2 nymphs, from the St. Francis River near Sam A. Baker State Park, Wayne County, Missouri, July 9, 1960; 8 males, 5 females, same data on June 24, 1961; 8 males, 9 females, same data on June 26, 1961; 3 males, 4 nymphs, from a stream at Patterson, Wayne County, Missouri, July 11, 1960; 4 females, 2 nymphs, same data on June 25, 1961; 12 males, 5 females, 1 nymph, collected in the Black River northwest of Piedmont, Reynolds County, Missouri, July 8, 1960; 5 males, 10 females, same data on June 26, 1961; 1 female, from the Current River at Big Spring State Park, Carter County, Missouri, July 12, 1960; 5 males, 3 females, 1 nymph, taken in the Jacks Fork River at Alley Spring State Park, Shannon County, Missouri, July 13, 1960; 11 males, 4 females, 1 nymph, same area where a cold spring joins the river, July 14, 1960; 2 females, 3 nymphs, from the Meramec River 11 miles northeast of Salem, Dent County, Missouri, July 19, 1960; 1 male, 2 females, same data on July 1, 1961; 4 males, collected in the Meramec River at Cook Station, Crawford County, Missouri, July 23, 1960; 1 male, 1 female, from the Eleven Point River near Greer Spring, Oregon County, Missouri, June 27, 1961; 2 females, from the Roaring River at Eagle Rock, Barry County, Missouri, July 6, 1961; 1 male, 1 nymph, taken in the King's River, Carroll



Figs. 27, 29, *Stygomomonium pallida*, n. sp.: 27, ventral shield, ♂; 29, dorsal shield, ♂. Figs. 28, 31, *S. neomexicana*, n. sp.: 28, ventral shield, ♀; 31, dorsal shield, ♀. Fig. 30, *S. moodyi* Mitchell, distal segments, 1st leg, ♀. Fig. 32, *S. plana*, n. sp., genital field area, ♂. Fig. 33, *S. occidentalis*, n. sp., genital field area, ♀.

County, Arkansas, July 21, 1960; 8 males, 1 female, 1 nymph, found in a small stream 1 mile north of Albion, Pushmataha County, Oklahoma, July 9, 1961; 1 male, 1 female, from a small stream 4 miles south of Attica, Warren County, Indiana, July 12, 1964; 1 female, taken in a stream near Lynch, Harlan County, Kentucky, July 15, 1964; 1 female, collected in a stream near Fredonia, Licking County, Ohio, June 18, 1967; 1 male, from a stream at Cedar Falls State Park,

Hocking County, Ohio, June 18, 1967; 1 male, 3 females, from a large stream near Haynes, Hocking County, Ohio, June 18, 1967; 9 males, 6 females, taken in a tributary of the Jackson River approximately 1.5 miles south of Bacova, Bath County, Virginia, May 19, 1961; 1 male, 1 female, found in a stream near Griffen, Hamilton County, New York, August 19, 1964; 3 males, 1 female, from the North Branch of the Meduxnekeag River, Aroostook County, Maine, August 28, 1964; 1 female, collected in a small stream near Limestone, Victoria County, New Brunswick, August 26, 1964; 1 female, from the Agawa River near the southern border of Lake Superior Provincial Park, Algoma District, Ontario, August 28, 1965.

Discussion: Habeeb (1957) originally described this species from the Salmon River, Victoria County, New Brunswick. Mitchell (1959) collected this species in Chittenden County, Vermont. The presence of four pairs of acetabula will distinguish this species from all other members of the genus.

***Stygomomonía (Stygomomonía) ozarkensis*, n. sp.**

(Figs. 21–23, 26)

Male: Dorsal shield 532μ in length, 395μ in width; peripheral thickening of dorsal shield not extending medially in direction of posterior glandularia (fig 26); ventral shield, including posterior glandularia platelets 516μ in length, 441μ in width; anterior coxal groups separated by articular membrane from the third coxae; 5 to 7 enlarged setae present on each side of fourth coxae posterior to the insertions of the fourth legs; genital field 128μ in width; 3 pairs of genital acetabula; posterior glandularia fused on their respective sides into oval platelets (fig. 23); these platelets 104μ in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, 17μ ; P-II, 55μ ; P-III, 27μ ; P-IV, 48μ ; P-V, 35μ ; structure of palp similar to that illustrated in fig. 19; dorsal lengths of the distal segments of the first leg: I-Leg-4, 81μ ; I-Leg-5, 197μ ; I-Leg-6, 80μ ; greatest height of distal segments of first leg: I-Leg-4, 41μ ; I-Leg-5, 59μ ; I-Leg-6, 41μ ; claw at tip of first leg 48μ in length; fig. 22 illustrates the proportions and chaetotaxy of the distal segments of the first leg; swimming hairs absent.

Female: Dorsal shield 547μ in length, 441μ in width; dorsal shield similar to male; ventral shield, including posterior glandularia platelets 578μ in length, 501μ in width; anterior coxal groups separated by articular membrane from the third coxae; 5 to 6 enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; acetabular plates and postgenital sclerite separated from the ventral shield (fig. 21); genital field 166μ in width; 3 pairs of genital acetabula; posterior glandularia platelets as described for male; postgenital sclerite 201μ in width; excretory pore without associated sclerotization; eyes reduced; integumental pigment absent.

Holotype: Adult male, from a gravel bar in a small stream on Route 116 approximately 1 mile west of Colcord, Delaware County, Oklahoma, July 7, 1961. *Allotype:* adult female, same data as holotype.

Discussion: The combination of three pairs of acetabula, lack of a

medial extension of the peripheral thickening of the dorsal shield, relatively short I-Leg-6 and greatly expanded I-Leg-4 are diagnostic for the present species.

***Stygomonomia (Stygomonomia) pallida*, n. sp.**

(Figs. 8, 19, 27, 29)

Male: Dorsal shield 517μ (464μ – 517μ) in length, 350μ (319μ – 350μ) in width; peripheral thickening of dorsal shield extending medially in direction of posterior glandularia (fig. 29), but not always as pronounced as in illustration; ventral shield, including posterior glandularia platelets 517μ (456μ – 517μ) in length, 388μ (373μ – 410μ) in width; anterior coxal groups separated by articular membrane from the third coxae; 5(4–6) enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; genital field 128μ (118μ – 130μ) in width; 3 pairs of genital acetabula, these 11μ – 17μ in diameter; posterior glandularia fused on their respective sides into oval platelets (fig. 27); these platelets 107μ (96μ – 107μ) in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, 15μ (15μ – 18μ); P-II, 48μ (46μ – 52μ); P-III, 27μ (24μ – 28μ); P-IV, 45μ (43μ – 48μ); P-V, 33μ (33μ – 38μ); fig. 19 illustrates the proportions and chaetotaxy of the palp; dorsal lengths of the distal segments of the first leg: I-Leg-4, 86μ (80μ – 86μ); I-Leg-5, 194μ (187μ – 204μ); I-Leg-6, 104μ (98μ – 104μ); greatest height of distal segments of first leg: I-Leg-4, 34μ (31μ – 34μ); I-Leg-5, 52μ (52μ – 55μ); I-Leg-6, 45μ (42μ – 45μ); claw at tip of first leg 69μ (66μ – 69μ) in length; fig. 8 shows the distal segments of the first leg; swimming hairs absent.

Female: Unknown.

Holotype: Adult male, taken in a sand and gravel bar in a tributary of the Jackson River approximately 1.5 miles south of Bacova, Bath County, Virginia, May 19, 1961. *Paratypes*: 5 males, same data as holotype.

Discussion: The combination of three pairs of genital acetabula, presence of medial extensions of the peripheral thickening of the dorsal shield, and relatively long I-Leg-6 (over one-half length of I-Leg-5) will distinguish the present species from other members of the genus.

***Stygomonomia (Stygomonomia) plana*, n. sp.**

(Figs. 13, 15, 16, 32)

Male: Dorsal shield 456μ in length, 312μ in width; structure of dorsal shield similar to that illustrated and described for female; ventral shield, including posterior glandularia platelets 454μ in length, 334μ in width; anterior coxal groups separated by articular membrane from the third coxae; 6 or 7 enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; genital field 90μ in width; 3 pairs of genital acetabula, these approximately 10μ in diameter; posterior glandularia fused on their respective sides into oval glandularia platelets (fig. 32); these platelets 107μ in greatest dimension; ex-

cretory pore without associated sclerotization; eyes reduced; integumental pigment absent.

Dorsal lengths of the palpal segments: P-I, 17μ ; P-II, 48μ ; P-III, 27μ ; P-IV, 45μ ; P-V, 33μ ; palp similar to that illustrated in fig. 14; dorsal lengths of the distal segments of the first leg: I-Leg-4, 69μ ; I-Leg-5, 173μ ; I-Leg-6, 111μ ; claw at tip of first leg 69μ in length; structure of first leg similar to female; swimming hairs absent.

Female: Dorsal shield 445μ (441μ - 502μ) in length, 304μ (289μ - 349μ) in width; peripheral thickened area of dorsal shield not extending medially in region of posterior glandularia (fig. 15); ventral shield 464μ (434μ - 517μ) in length, 334μ (327μ - 380μ) in width; anterior coxal groups separated by articular membrane from the third coxae; 5 to 7 enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; acetabular plates and post-genital sclerite separated from the ventral shield (fig. 13); genital field 118μ (111μ - 121μ) in width; the individual acetabular plates 31μ (28μ - 31μ) in width; 3 pairs of genital acetabula; posterior glandularia as described for the male; these glandularia platelets 105μ (100μ - 114μ) in greatest dimension; excretory pore without associated sclerotization; eyes reduced; integumental pigment absent.

Dorsal lengths of the palpal segments: P-I, 15μ (15μ - 17μ); P-II, 45μ (42μ - 51μ); P-III, 24μ (24μ - 29μ); P-IV, 42μ (42μ - 46μ); P-V, 31μ (31μ - 33μ); dorsal lengths of the distal segments of the first leg: I-Leg-4, 78μ (69μ - 80μ); I-Leg-5, 170μ (170μ - 207μ); I-Leg-6, 111μ (104μ - 134μ); greatest height of distal segments of first leg: I-Leg-4, 29μ (28μ - 29μ); I-Leg-5, 48μ (48μ - 52μ); I-Leg-6, 48μ (45μ - 48μ); claw at tip of first leg 80μ (69μ - 93μ); dorsoproximal portion of I-Leg-6 extending slightly proximally (fig. 16); swimming hairs absent.

Holotype: Adult male, taken in gravel deposits in the South Fork of the Trinity River near Forest Glen, Trinity County, California, July 30, 1966. *Allotype*: adult female, same data as holotype. *Paratypes*: 1 female, same data as holotypes; 1 male, found in a gravel bar in Salmon Creek on Highway no. 1, Monterey County, California, July 23, 1966; 1 female, from gravel deposits in the Big Sur River at Big Sur Camp Grounds, Monterey County, California, July 23, 1966; 1 female, collected in a gravel bar in the Van Duzen River 16 miles east of Bridgeville, Humboldt County, California, July 30, 1966; 1 female, found in a gravel bar in Satus Creek (on US 97 approximately 3 miles south of the Yakima County line), Klickitat County, Washington, August 18, 1961.

Discussion: The combination of three pairs of acetabula, lack of medial extensions of the peripheral thickening of the dorsal shield, enlarged posterior glandularia platelets, and comparatively large I-Leg-6 will separate the present species from all other members of the genus.

***Stygomonomia (Stygomonomia) occidentalis*, n. sp.**

(Figs. 5, 6, 9, 14, 33)

Male: Dorsal shield 410μ (410μ - 547μ) in length, 289μ (289μ - 395μ) in width; peripheral thickening of dorsal shield not extending medially in region of posterior

glandularia (fig. 9); ventral shield, including posterior glandularia platelets $426\mu(426\mu-547\mu)$ in length, $327\mu(327\mu-449\mu)$ in width; anterior coxal groups separated by articular membrane from the third coxae; 3-5(3-6) enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; genital field $98\mu(98\mu-117\mu)$ in width; 3 pairs of genital acetabula, these $10\mu(8\mu-10\mu)$ in diameter; posterior glandularia fused on their respective sides into oval platelets (fig. 6); excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, $14\mu(14\mu-18\mu)$; P-II, $47\mu(47\mu-55\mu)$; P-III, $22\mu(22\mu-27\mu)$; P-IV, $42\mu(42\mu-48\mu)$; P-V, $29\mu(29\mu-38\mu)$; fig. 14 illustrates the proportions and chaetotaxy of the palp; dorsal lengths of the distal segments of the first leg: I-Leg-4, $69\mu(69\mu-83\mu)$; I-Leg-5, $159\mu(159\mu-194\mu)$; I-Leg-6, $73\mu(73\mu-93\mu)$; greatest height of the distal segments of the first leg: I-Leg-4, $28\mu(28\mu-32\mu)$; I-Leg-5, $42\mu(42\mu-52\mu)$; I-Leg-6, $31\mu(31\mu-38\mu)$; claw at tip of first leg $48\mu(48\mu-62\mu)$ in length; structure of first leg similar to female; swimming hairs absent.

Female: Dorsal shield $441\mu(441\mu-547\mu)$ in length, $304\mu(304\mu-395\mu)$ in width; dorsal shield similar to that of male; ventral shield, including posterior glandularia platelets $440\mu(440\mu-539\mu)$ in length, $334\mu(334\mu-440\mu)$ in width; anterior coxal groups separated by articular membrane from the third coxae; 5-7(4-7) enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; acetabular plates and postgenital sclerite separated from the ventral shield (fig. 33); genital field $121\mu(121\mu-159\mu)$ in width; the individual acetabular plates $26\mu(26\mu-34\mu)$ in width; 3 pairs of genital acetabula, these $10\mu(9\mu-12\mu)$ in diameter; postgenital sclerite $145\mu(145\mu-200\mu)$ in width; posterior glandularia as described for the male; excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, $13\mu(13\mu-17\mu)$; P-II, $46\mu(46\mu-55\mu)$; P-III, $24\mu(24\mu-28\mu)$; P-IV, $43\mu(43\mu-50\mu)$; P-V, $32\mu(32\mu-41\mu)$; palp similar to male; dorsal lengths of the distal segments of the first leg: I-Leg-4, $71\mu(71\mu-90\mu)$; I-Leg-5, $173\mu(170\mu-211\mu)$; I-Leg-6, $76\mu(76\mu-100\mu)$; greatest height of the distal segments of the first leg: I-Leg-4, $28\mu(28\mu-35\mu)$; I-Leg-5, $42\mu(42\mu-55\mu)$; I-Leg-6, $31\mu(31\mu-38\mu)$; claw at tip of first leg $46\mu(46\mu-66\mu)$ in length; fig. 5 illustrates these segments; swimming hairs absent.

Holotype: Adult male, taken in a sand bar in the Rogue River (1 mile south of the Douglas County line), Jackson County, Oregon, August 11, 1961. *Allotype:* adult female, same data as holotype. *Paratypes:* 1 female, same data as holotype; 3 males, from a gravel bar in Swauk Creek at Swauk Creek Camp Ground, Kittitas County, Washington, August 19, 1961; 2 males, 11 females, collected in a gravel bar in the Fisher River 30 miles southeast of Libby, Lincoln County, Montana, August 22, 1961; 1 male, 1 female, from a gravel bar in the Swan River approximately 6 miles southeast of Bigfork, Lake County, Montana, August 25, 1961; 1 male, from a gravel bar in Salmon Creek on Highway no. 1, Monterey County, California, July 23, 1966; 1 male, 2 females, taken in a gravel bar in Moccasin Creek (on State Road no. 49 six miles southeast of State Road no. 120), Tuolumne County, California, July 24, 1966.

Discussion: The combination of three pairs of acetabula, lack of medially-directed extensions of the peripheral thickening of the dorsal shield, enlarged posterior glandularia platelets, and relatively short I-Leg-6 will separate *S. occidentalis* from all other species of the genus found in North America.

***Stygomonomia (Stygomonomia) separata*, n. sp.**

(Figs. 4, 10–12)

Male: Dorsal shield $562\mu(502\mu-562\mu)$ in length, $410\mu(380\mu-410\mu)$ in width; peripheral thickening of the dorsal shield not extending medially in region of the posterior glandularia (fig. 11); ventral shield, including posterior glandularia platelets $540\mu(494\mu-540\mu)$ in length, $464\mu(441\mu-464\mu)$ in width; anterior coxal groups separated by articular membrane from the third coxae; 4–5(3–5) enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; genital field $121\mu(107\mu-121\mu)$ in width; 3 pairs of genital acetabula; the 2 pairs of glandularia posterior to the ventral shield small and separated (fig. 10); excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, $16\mu(14\mu-17\mu)$; P-II, $55\mu(48\mu-55\mu)$; P-III, $27\mu(24\mu-27\mu)$; P-IV, $52\mu(48\mu-52\mu)$; P-V, $38\mu(32\mu-38\mu)$; structure of palp similar to that illustrated in fig. 14; dorsal lengths of the distal segments of the first leg: I-Leg-4, $91\mu(80\mu-91\mu)$; I-Leg-5, $239\mu(215\mu-239\mu)$; I-Leg-6, $142\mu(128\mu-142\mu)$; greatest height of distal segments of first leg: I-Leg-4, $31\mu(29\mu-31\mu)$; I-Leg-5, $66\mu(56\mu-66\mu)$; I-Leg-6, $52\mu(48\mu-52\mu)$; dorsoproximal portion of I-Leg-6 extending somewhat proximally (fig. 4); claw at tip of first leg 100μ in length; swimming hairs absent.

Female: Dorsal shield $586\mu(532\mu-608\mu)$ in length, $456\mu(395\mu-456\mu)$ in width; dorsal shield similar to that of male; ventral shield, including posterior glandularia platelets $570\mu(525\mu-608\mu)$ in length, $502\mu(456\mu-524\mu)$ in width; anterior coxal groups separated by articular membrane from the third coxae; 5–7(4–7) enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; acetabular plates and postgenital sclerite separated from the ventral shield (fig. 12); genital field $149\mu(142\mu-168\mu)$ in width; the individual acetabular plates $38\mu(36\mu-42\mu)$ in width; 3 pairs of genital acetabula; the posterior glandularia as described for the male; excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, $17\mu(16\mu-20\mu)$; P-II, $62\mu(59\mu-62\mu)$; P-III, $35\mu(29\mu-35\mu)$; P-IV, $55\mu(50\mu-55\mu)$; P-V, $42\mu(38\mu-43\mu)$; dorsal lengths of the distal segments of the first leg: I-Leg-4, $97\mu(93\mu-100\mu)$; I-Leg-5, $263\mu(231\mu-263\mu)$; I-Leg-6, $149\mu(142\mu-149\mu)$; greatest height of distal segments of the first leg: I-Leg-4, $35\mu(34\mu-35\mu)$; I-Leg-5, $72\mu(66\mu-72\mu)$; I-Leg-6, $59\mu(52\mu-59\mu)$; claw at tip of first leg $107\mu(93\mu-107\mu)$ in length; structure of palp and first leg similar to male; swimming hairs absent.

Holotype: Adult male, found in a gravel bar in Satus Creek (on US 97 approximately 3 miles south of the Yakima County Line), Klickitat County, Washington, August 18, 1961. *Allotype:* adult female, same

data as holotype. *Paratypes*: 1 female, same data as holotype; 4 males, 12 females, from a gravel bar in Ten Mile Creek approximately 7 miles south of Yachats, Lane County, Oregon, August 13, 1961; 1 female, taken in a gravel bar in the Fisher River 30 miles southeast of Libby, Lincoln County, Montana, August 22, 1961.

Discussion: There are three known species of *Stygomonomia s. s.* which possess two pairs of small glandularia platelets at the posterior end of the ventral shield. These include *S. hachiojiensis* described by Imamura (1959) from Japan, and the two North American species, *S. separata* and *S. neomexicana*. The present species differs in that I-Leg-6 is more than one-half the length of I-Leg-5.

***Stygomonomia (Stygomonomia) neomexicana*, n. sp.**

(Figs. 7, 28, 31)

Female: Dorsal shield 562μ in length, 410μ in width; peripheral thickening of the dorsal shield extending somewhat medially in direction of posterior glandularia (fig. 31); ventral shield, including posterior glandularia platelets 555μ in length, 471μ in width; anterior coxal groups separated by articular membrane from the third coxae; 5 enlarged setae present on each side of the fourth coxae posterior to the insertions of the fourth legs; acetabular plates and postgenital sclerite separated from the ventral shield; genital field 145μ in width; the individual acetabular plates 31μ in width; 3 pairs of genital acetabula; posterior glandularia platelets small, separated on one side, lightly fused on the other side (fig. 28); excretory pore without associated sclerotization; eyes reduced; integumental pigmentation absent.

Dorsal lengths of the palpal segments: P-I, 21μ ; P-II, 60μ ; P-III, 32μ ; P-IV, 55μ ; P-V, 41μ ; structure of palp similar to that illustrated in fig. 14; dorsal lengths of the distal segment of the first leg: I-Leg-4, 100μ ; I-Leg-5, 228μ ; I-Leg-6, 98μ ; greatest height of the distal segments of the first leg: I-Leg-4, 38μ ; I-Leg-5, 59μ ; I-Leg-6, 45μ ; claw at tip of first leg 66μ in length; figure 7 illustrates these segments; swimming hairs absent.

Male: Unknown.

Holotype: Adult female, taken in a gravel bar in Whitewater Creek approximately 5 miles northeast of Glenwood, Catron County, New Mexico, July 13, 1966.

Discussion: The structure of I-Leg-6 with its dorsoproximal projection extending distally (fig. 7) will separate the present species from both *S. hachiojiensis* and *S. separata*.

REFERENCES

- Habeeb, H. 1957. A subterranean mite. Leaflets of Acadian Biol. 15:8.
Hopkins, C. L. 1966. Two new species of water-mite (Acari, Hydrachnellae) from New Zealand. Trans. Roy. Soc. New Zealand 8:111-117.
Imamura, T. 1959. Water-mites (Hydrachnellae) of subterranean waters in Kanto District, Japan. Acarologia 1:426-451.
Mitchell, R. D. 1959. A new water-mite of the genus *Stygomonomia* (Family Momiidae). Trans. Amer. Microsc. Soc. 78:154-157.